Chemistry and Introduction to Biochemistry
Multiple choice questions: select the correct answer (one) by crossing the corresponding box.
Formulas: draw all the atoms, bonds and charges (when applicable).
Quantitative exercises: briefly explain your chosen procedure and copy the final result(s) in the brackets at the end of the text.

1) For a gas, a P = costante un doubling temperature induces:
    a decreas in volume   [ ]
    an increase in volume   [ ]
    an increase in density   [ ]
    no change in volume   [ ]

2) Il D-glucose e il D-fructose are:
    epimers   [ ]
    functional isomers   [ ]
    enantiomeri   [ ]
    optical isomers   [ ]

3) In a 0.2 M ammonia solution 0.05% ionized the ammonium ion concentration is:
    0,0001 M   [ ]
    0,01 M   [ ]
    0,001 M   [ ]
    0,1 M   [ ]

4) The chemical formula of calcium hydroxide is:
    $Ca_2(OH)_3$ [ ]
    $Ca(OH)_2$ [ ]
    $CaOH$ [ ]
    Ca_2OH [ ]

5) In the reaction $2 NO_2 \rightleftharpoons N_2O_4$, an increase of volume at constant temperature causes:
    stopping the the inverse reaction   [ ]
    equilibrium shift with an increase of NO_2 [ ]
    a decrease of the equilibrium constant   [ ]
    equilibrium shift with an increase of N_2O_4 [ ]

6) which of the following compounds is not aromatic?
    naftalene   [ ]
    benzene   [ ]
    1,3-cicloesadiene   [ ]
    phenol   [ ]

7) Draw the chemical formula of each compound indicating all the atoms, bonds and charges (when applicable): *orto*-diclorobenzene, fructose, 2-amminopropane, glycerol

8) To 800 mL of a solution containing 0.04 M formic acid and 0.03 M sodium formiate, 1.5 mL of sodium hydroxide 1 M are. Calculate the pH of the solution before and after adding the base
(K_A of formic acid: $2 \cdot 10^{-4}$ M)

9) A gas mixture is formed by 0.8 mole of HCl and 0.2 moles of O_2 , in a 10 L container.
The following homogeneous reaction takes palce: $4 HCl (g) + O_2 (g) \rightleftharpoons 2 Cl_2 (g) + 2 H_2O$ (g), and 15% of HCl is consumed.
Calculate K_C e K_P at 2000 K and indicate its dimensions.

10) Calculate the osmotic pressure of a water solution containing 10 g of fructose and 6 g of potassium sulphate in a total volume of 600 mL at 25°C.

11) Calculate the pH of a solution that contains 3 g di cloruro of ammonium chloride in a final volume of 500 mL (K_B ammonia is $1.8 \cdot 10^{-5}$ M).